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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/041,011	01/07/2002	Takeo Oita	1503.66084	2591

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EXAMINER	
SHINGLETON, MICHAEL B	
ART UNIT	PAPER NUMBER
2817	

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/041,011	OITA, TAKEO	
	Examiner	Art Unit	
	Michael B. Shingleton	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4-8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art as represented by Figures 1 and 2 of the instant application (AAPA) in view of Horn "Basic electronics Theory" 4th edition pp 478-487 (Horn) and Benes et al. US 4,817,430 (Benes).

As it relates to independent claim 1, AAPA discloses a synchronous signal generator converting an output, which is a sine wave from a crystal oscillator 1 of an oscillation frequency f into a pulse of a rectangular waveform by a pulse converter 2. AAPA fails to show the output from the crystal oscillator connected to a filter that is equal to the oscillation frequency f in center frequency fO, and where the output of the filter is connected to the input of the pulse converter.

As it relates to independent claim 6, AAPA discloses a synchronous signal generator, having a crystal oscillator unit 1 oscillating an output signal and a pulse conversion unit 2 outputting a pulse of a rectangular wave-form based on output of the crystal oscillator. AAPA, like that above as it relates to claim 1, fails to recite a "filter unit" converting an output signal from the crystal oscillator unit into a signal close to an ideal sine wave, and outputting this converted signal to the input of the pulse converter.

As it relates to independent claim 11, AAPA discloses a synchronous signal generator, having a crystal oscillator means 1 for oscillating an output signal and a pulse conversion means 2 for outputting a pulse of a rectangular waveform based on output of the crystal oscillator. AAPA, like that above as it relates to claims 1 and 6, fails to recite a "filter means" for converting an output signal from the crystal oscillator means into a signal close to an ideal sine wave, and outputting the converted signal to the input of the pulse converter.

As it relates to independent claim 12, AAPA discloses a synchronous signal generating method obtaining a synchronous signal from the output of crystal oscillator unit 1 oscillating an output signal, having the steps of converting the output of the oscillating unit into a pulse signal of a rectangular wave-

form via pulse converter 2. AAPA, like that of claims 1, 6, and 11, fails to provide for a means that converts "an output signal from said crystal oscillator unit into a signal closed (sic) to an ideal sine wave" i.e. in light of the specification the converting step is actually a filtering step like that recognized in independent claims 1, 6 and 11.

Horn recognizes that a totally harmonic-free sine wave is quite difficult to achieve (See page 478) and gives examples of sine-wave oscillators including crystal oscillators recited on pages 484-487. Thus Horn recognizes the long-standing problem with oscillators (Note Figure 2 of the instant invention.).

Figure 6 of Benes addresses this long-standing problem with crystal oscillators. Figure 6 of Benes discloses a crystal oscillator composed of at least elements 3 and 8. The normal output U_{OSC} is more or less a square-wave and that "it is advantageous to filter out the 3rd harmonic" (See column 7, lines 39-46). Benes solves this long-standing problem by providing a band-pass filter 32 to filter out the undesired harmonics and produce a signal U_D.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a band-pass filter between the oscillator unit and the pulse converter of AAPA so as to filter the crystal oscillator and accordingly produce an ideal sine wave thereby solving the long standing problem of crystal oscillators as taught by Horn and Benes.

As it relates to claim 4, the synchronous signal generator of AAPA has an oscillation frequency f is equal to a frequency of a fundamental wave component output from the crystal oscillator as shown in Figure 2 of the instant application.

As it relates to claim 5, the pulse converter 2 of AAPA has the same reference number as the pulse converter of the instant invention (See Figure 4) and therefore they are identical in structure and must include the "pulse converter is a complementary output driver IC" language of claim 5 for if theses pulse converters 2 were not identical they would have different reference numbers. Note MPEP 608.02 that states: "no single reference character is used for two different parts".

As it relates to claim 7, the filter unit made obvious above is a band-pass filter that filters out the harmonic(s) but passes the fundamental so as to produce a more realistic sine wave. Thus the language of claim 7 "filter unit converts the signal such that a level of a specific frequency component in the output signal from said crystal oscillator unit can be relatively higher than levels of other frequency components, and outputs a resultant signal" is clearly an obvious consequence of the invention made obvious above.

As it relates to claim 8, as noted with respect to claim 7 the filter is a band pass filter that filters out the harmonic(s). The harmonics lies outside the center frequency so the centering of the filter to the center frequency of the generator only makes for common engineering sense for that center frequency f1

is the desired frequency and a filter passes the desired frequency the best when the filter is centered about that frequency. Alternatively, selecting the center frequency of a filter for a system is merely the selection of the optimum or workable range and as such involves but routine skill in the art the selection of this center frequency to be a the center frequency "f1" of the synchronous signal generator would have been obvious to one of ordinary skill in the art at the time the invention was made.

Claims 2, 3, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Horn and Benes as applied to claims 1,4-8, 11 and 12 above, and further in view of Inao et al. US 5,382,929 (Inao) and Gibilisco "Handbook of Radio & Wireless Technology" pp195-197.

All the same reasoning as applied in the 35 USC 103 rejection of claim 1, 4-8, 11 and 12 and the following: Claims 2, 3, 9 and 10 in effective recites that the filter unit is a crystal filter. Benes describes that two inductively coupled parallel resonant circuits can make up the filter (See column 7, lines 49 and 50), however, Benes is not limited to just this type of filter. Note that Benes teaches that any band pass filter can be used especially those "known in radio technology" (See column 7, lines 47 and 48). Benes, Horn and AAPA are silent on the filter unit being "a crystal filter equal to the crystal oscillator in frequency-temperature characteristic" (claim 2), a crystal filter "wherein respective crystal pieces used for the crystal oscillator and the crystal filter have an equal cutting angle" (claims 3 and 10 however, note that claim 10 uses a slightly different wording describing the same feature.) and a filter wherein the "filter unit is equal to said crystal oscillator unit in frequency-temperature characteristic" (claim 9).

Inao discloses that one common form of band pass filter used in the radio technology area is the crystal filter (See column 1, lines 5-15).

As the Benes reference specifically teaches that any conventional radio technology filter can be employed such as a band-pass filter and Inao discloses that the crystal filter is a conventional form of band pass filter used in the radio technology area. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the band pass filter of Inao in place of the generic filter of Benes because, as the reference is silent as to the exact filter circuit, any art-recognized equivalent crystal band pass filter would have been usable such as the well-known conventional band pass filter as taught by Inao. As to the specific features of claims 2, 3, 9 and 10 wherein the crystal filter forming the filter has the same crystal characteristics of the oscillator crystal such as the equal cutting angle, the same frequency-temperature characteristic, these are all selections of the optimum or workable in designing a crystal filter which involves but routine skill in the art. Note Gibilisco clearly recognizes the design criteria known to those of routine skill, specifically that the

frequency of the crystal is determined "mainly by the thickness of the crystal and the angle at which it is cut". Since the selection of the thickness, cut angle, etc. are all design criteria that determines the optimum or workable range for a filter which involves routine skill in the art, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the thickness, cut angles etc. to be equal to the characteristics of the crystal of the oscillator so as to provide for a band-pass filter in the obvious combination above centered around the main oscillator frequency as this involves mere routine skill in the art as recognized by Gibilisco.

Claims 1, 4-8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art as represented by Figures 1 and 2 of the instant application (AAPA) in view of Horn "Basic electronics Theory" 4th edition pp 478-487 (Horn) and Malinowski et al. US 4,859,969 (Malinowski).

As it relates to independent claim 1, AAPA discloses a synchronous signal generator converting an output, which is a sine wave from a crystal oscillator 1 of an oscillation frequency f into a pulse of a rectangular waveform by a pulse converter 2. AAPA fails to show the output from the crystal oscillator connected to a filter that is equal to the oscillation frequency f in center frequency fO, and where the output of the filter is connected to the input of the pulse converter.

As it relates to independent claim 6, AAPA discloses a synchronous signal generator, having a crystal oscillator unit 1 oscillating an output signal and a pulse conversion unit 2 outputting a pulse of a rectangular wave-form based on output of the crystal oscillator. AAPA, like that above as it relates to claim 1, fails to recite a "filter unit" converting an output signal from the crystal oscillator unit into a signal close to an ideal sine wave, and outputting this converted signal to the input of the pulse converter.

As it relates to independent claim 11, AAPA discloses a synchronous signal generator, having a crystal oscillator means 1 for oscillating an output signal and a pulse conversion means 2 for outputting a pulse of a rectangular waveform based on output of the crystal oscillator. AAPA, like that above as it relates to claims 1 and 6, fails to recite a "filter means" for converting an output signal from the crystal oscillator means into a signal close to an ideal sine wave, and outputting the converted signal to the input of the pulse converter.

As it relates to independent claim 12, AAPA discloses a synchronous signal generating method obtaining a synchronous signal from the output of crystal oscillator unit 1 oscillating an output signal, having the steps of converting the output of the oscillating unit into a pulse signal of a rectangular wave-

form via pulse converter 2. AAPA, like that of claims 1, 6, and 11, fails to provide for a means that converts "an output signal from said crystal oscillator unit into a signal closed (sic) to an ideal sine wave" i.e. in light of the specification the converting step is actually a filtering step like that recognized in independent claims 1, 6 and 11.

Horn recognizes that a totally harmonic-free sine wave is quite difficult to achieve (See page 478) and gives examples of sine-wave oscillators including crystal oscillators recited on pages 484-487. Thus Horn recognizes the long-standing problem with oscillators (Note Figure 2 of the instant invention.).

Figure 4 of Malinowski addresses this long-standing problem with crystal oscillators by providing a crystal filter that passes the desired fundamental and filters out the rest (See column 3 around line 25). Malinowski also recognizes the use of the oscillator for a clock drive unit.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a crystal based band-pass filter between the oscillator unit and the pulse converter of AAPA so as to filter the crystal oscillator and accordingly produce an ideal sine wave thereby solving the long standing problem of crystal oscillators as taught by Horn and Malinowski.

As it relates to claim 4, the synchronous signal generator of AAPA has an oscillation frequency f is equal to a frequency of a fundamental wave component output from the crystal oscillator as shown in Figure 2 of the instant application.

As it relates to claim 5, the pulse converter 2 of AAPA has the same reference number as the pulse converter of the instant invention (See Figure 4) and therefore they are identical in structure and must include the "pulse converter is a complementary output driver IC" language of claim 5 for if theses pulse converters 2 were not identical they would have different reference numbers. Note MPEP 608.02 that states: "no single reference character is used for two different parts".

As it relates to claim 7, the filter unit made obvious above is a band-pass filter that filters out the harmonic(s) but passes the fundamental so as to produce a more realistic sine wave. Thus the language of claim 7 "filter unit converts the signal such that a level of a specific frequency component in the output signal from said crystal oscillator unit can be relatively higher than levels of other frequency components, and outputs a resultant signal" is clearly an obvious consequence of the invention made obvious above.

As it relates to claim 8, as noted with respect to claim 7 the filter is a band pass filter that filters out the harmonic(s). The harmonics lies outside the center frequency so the centering of the filter to the center frequency of the generator only makes for common engineering sense for that center frequency f1 is the desired frequency and a filter passes the desired frequency the best when the filter is centered about that frequency. Alternatively, selecting the center frequency of a filter for a system is merely the

selection of the optimum or workable range and as such involves but routine skill in the art the selection of this center frequency to be a the center frequency "f1" of the synchronous signal generator would have been obvious to one of ordinary skill in the art at the time the invention was made.

Claims 2, 3, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Horn and Malinowski as applied to claims 1,4-8, 11 and 12 above, and further in view of Gibilisco "Handbook of Radio & Wireless Technology" pp195-197.

All the same reasoning as applied in the 35 USC 103 rejection of claim 1, 4-8, 11 and 12 and the following: Claims 2, 3, 9 and 10 in effective recites that the filter unit is a crystal filter. Malinowski describes a crystal filter (See Figure 4). Malinowski, Horn and AAPA are silent on the filter unit being "a crystal filter equal to the crystal oscillator in frequency-temperature characteristic" (claim 2), a crystal filter "wherein respective crystal pieces used for the crystal oscillator and the crystal filter have an equal cutting angle" (claims 3 and 10 however, note that claim 10 uses a slightly different wording describing the same feature.) and a filter wherein the "filter unit is equal to said crystal oscillator unit in frequency-temperature characteristic" (claim 9).

As to the specific features of claims 2, 3, 9 and 10 wherein the crystal filter forming the filter has the same crystal characteristics of the oscillator crystal such as the equal cutting angle, the same frequency-temperature characteristic, these are all selections of the optimum or workable in designing a crystal filter which involves but routine skill in the art. Note Gibilisco clearly recognizes the design criteria known to those of routine skill, specifically that the frequency of the crystal is determined "mainly by the thickness of the crystal and the angle at which it is cut". Since the selection of the thickness, cut angle, etc. are all design criteria that determines the optimum or workable range for a filter which involves routine skill in the art, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the thickness, cut angles etc. to be equal to the characteristics of the crystal of the oscillator so as to provide for a band-pass filter in the obvious combination above centered around the main oscillator frequency as this involves mere routine skill in the art as recognized by Gibilisco.

Response to Arguments

Applicant's arguments filed 08-06-2004 have been fully considered but they are not persuasive. Applicant believes that the filter 32 of Benes "is not set to the frequency of the crystal oscillator". The examiner respectfully disagrees. What the claims and the disclosed invention set forth is the passing of the fundamental with the filtering of some or all of the frequencies that lie outside the fundamental. Applicant's claims sets forth language like a filter equal to the oscillation frequency f in center frequency f0. In the case of applicant's invention this does not mean that the center frequency is filtered out. What is does mean is that the center or fundamental is passed. The claims just do not recite how much is filtered outside the fundamental frequency. Benes does recognize that harmonics are detrimental and it is advantageous to filter out harmonics with the third harmonic being the one with the greatest magnitude as recognized by applicant. Since the claims do not set forth the amount of filtering outside the fundamental Benes is still seen as meeting the claim language limitations. Applicant makes issue with the fact that the oscillator of Benes is used in a system for determining the thickness of a varying material coatings and Applicant recites that the Horn reference does not identify the specific problem or solution addressed by the present invention". The fact that the Benes reference disclosed additional structure not disclosed or claimed does not distract for what it teaches. It is what the combined teaches of the prior art suggests to those of ordinary skill in the art. While the AAPA reference may not say directly that it suffers from harmonic generation the fact is that the AAPA reference does suffers from harmonic generation a is recognized by Horn and Benes. Benes teaches the solution and that is to filter out the undesirable frequencies or frequency. It is what these references combined that suggests filtering out the undesirable frequencies in the AAPA reference that is the crux of the rejection. Applicant has provided an information disclosure after the previous non-final office action. Here the Malinowski 4,859,969 reference has been cited. Figure 4 as described in column 3 around line 27 recites filtering out the undesirable frequencies to pass just the fundamental. These undesirable frequencies are in this case is the harmonics for this output frequency fo is to be used with clock drive applications, i.e. a pulse converter (clock drive) is provided as a clock output is typically a square wave. The Malinowski just further emphases the fact that a crystal oscillator generates harmonics that are not desirable especially in clocking operations. A well-known and well established problem. The solution like that of Benes is to filter out the undesirable frequencies.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770. The examiner can normally be reached on Tues-Fri from 8:30 to 4:30. The examiner can also be reached on alternate Mondays. The examiner normally has the second Mondays of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS
October 08, 2004

MICHAEL B. SHINGLETON
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